National Park Service
2005 Environmental Achievement Awards

Winner

"Turning Buildings Green: A Sustainable Design Success Story at Yellowstone"
Yellowstone National Park and Xanterra Parks and Resorts (Concessioner)

Yellowstone National Park – one of the nation's most recognized and popular national parks – and Xanterra Parks & Resorts – a Yellowstone National Park concessioner providing lodging, food and beverage, retail, marina, horse livery, and other visitor services – partnered for the environmentally sensitive design and construction of new concessioner employee housing. In 2004, Yellowstone National Park and Xanterra Parks & Resorts completed construction of two new single-family housing units in Gardiner, Montana using the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) Green Building Rating System.

Highlights of the completed new employee housing project include the following:

- The new housing is located on NPS land in Gardiner, Montana, that was previously another concessioner's fuel transfer facility. The land was remediated by removing old concrete slabs, tin sheds, rusted fuel tanks, rebar, leaking oil drums, solid waste, noxious weeds, and oil-contaminated soils that otherwise may have lingered as an economic and environmental drag.
- The housing lot was landscaped with native, drought-resistant plants, which avoids the need to use water for irrigation.
- Through the use of extended overhangs, the houses were designed to keep the hot, high summer sun out; however, the low, winter sun can enter through south-facing windows that have window glazing adjusted to allow for maximum ultraviolet radiation penetration.
- Concrete slab flooring and concrete walls function as the thermal mass that store heat energy in the day and release it at night to reduce heating needs in the houses.
- Integrated concrete form (ICF) walls and structural insulated panel (SIP) rooftops were used, resulting in higher insulation values (R-38 and R-60 respectively). (With conventional wood framing and fiberglass insulation and roofing, traditional insulation values are R-16 and R-30 respectively.)
- 53 percent of construction waste was diverted from disposal; this included 11,000 pounds of scrap wood; 48,000 pounds of landscape rock; 16,000 pounds of gypsum sheetrock; 3,200 pounds of steel; 15,000 pounds of concrete; and 2,100 pounds of cardboard.
- Each house has a 1.2 kW solar photovoltaic generation system that is tied to the electricity grid. When more electricity is being generated than used, it is put back into the electricity grid and Xanterra Parks & Resorts receives a credit on electricity bills.
- 100 percent of the electricity purchased from the electricity grid over the next two years is being purchased from renewable sources – wind energy from Colorado wind farms.

- All lighting fixtures in the houses are compact fluorescent lamps or fluorescent tubes that consume 70 percent less energy and last 13 times longer than incandescent lights.
- To further conserve energy and water, low-flow showerheads (under 2.5 gallons per minute), ultra low-flow faucets (0.5 gallons per minute), dual flush toilets (0.8 gallons per flush for liquid waste, 1.6 gallons per flush for solid waste), and Energy Star qualified appliances are used throughout the buildings.
- To improve indoor air quality, all paints, adhesives, glues, and caulks are water-based or are low VOC; the carpet purchased emits no VOCs and is recycled at the end of its useful life; almost all windows open to allow cross-ventilation; and warm, moist air from the bathrooms heats dry, fresh air from the outside.
- A condition of occupancy requires residents to monitor the homes' performance and meet certain environmental objectives. For example, on the first day of every month, residents are required to record the total number of kW hours from the photovoltaic panels, and readings from the propane gas, electric grid, and water meters.
- During construction, an effort was made to open the houses to public tours, forums, and media events to educate visitors and the community. These efforts will continue, even during occupancy of the houses.

It is hoped that the process for designing and constructing these houses will serve as model to other NPS and Department of the Interior managers. Lessons learned from building these houses will also be used when construction of the new Old Faithful Visitor Center begins using LEED guidelines.